B-5

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/006,852	11/07/2001	Alan M. Kinnersley	7224-65	8960

7590 07/29/2004

Gregory B. Coy
Woodard, Emhardt, Naughton, Moriarty and McNett
Bank One Center/Tower
111 Monument Circle, Suite 3700
Indianapolis, IN 46204-5137

EXAMINER	
COLLINS, CYNTHIA E	
ART UNIT	**PAPER NUMBER**
1638	

DATE MAILED: 07/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/006,852	KINNERSLEY ET AL.	
	Examiner	Art Unit	
	Cynthia Collins	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 April 2004 and 06 May 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32 and 34-40* is/are pending in the application.

4a) Of the above claim(s) *16-18,21,24,25,29 and 30* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15,19,20,22,23,26-28,31,32 and 34-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

The Amendments and declaration filed May 6, 2004 and April 23, 2004 have been entered.

Claim 33 is cancelled.

Claims 16-18, 21, 24-25 and 29-30 are withdrawn.

Claims 8, 14, 19-20, 22, 26, 28, 31-32, 34-35, 37-38 and 40 are currently amended.

Claims 1-32 and 34-40 are pending.

Claims 1-15, 19-20, 22-23, 26-28, 31-32 and 34-40 are examined.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

All previous objections and rejections not set forth below have been withdrawn.

Election/Restrictions

Applicants reiterate their traversal of election with traverse of the requirement with respect to the individually recited sequences on the ground(s) that, in keeping with the guidance set forth in Section 803.04 of the MPEP, it is not appropriate in this case to require a restriction between the sequences, since MPEP 803.04 indicates that the Commissioner has partially waived the requirements of 37 CFR 1.141 to permit a reasonable number (normally up to ten) of sequences to be claimed in a single application, and since only nine polynucleotide and corresponding amino acids sequences are presented in claims of the instant application (reply pages 10-11). This is not found persuasive because databases and resource allocations at the PTO have changed since the publication of MPEP 803.04, such that the search and examination

of more than one polynucleotide and corresponding amino acid sequence on the merits in the instant application would present a burden on PTO resources.

Claim Objections

Claims 8, 12, 28, 35 and 40 remain objected to for the reasons of record set forth in the office action mailed November 20, 2003.

Applicants' arguments filed April 23, 2004, have been fully considered but they are not persuasive.

Applicants argue that the objection should be withdrawn for the reasons stated above regarding the restriction requirement imposed between the individually recited sequences (reply page 11).

The objection is maintained for the reasons stated above regarding the restriction requirement imposed between the individually recited sequences.

Claim Rejections - 35 USC § 112

Claims 8, 12, 19, 20, 22, 23, 28, 32, 35 and 40 remain rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention, for the reasons of record set forth in the office action mailed November 20, 2003.

Applicants' arguments filed April 23, 2004, have been fully considered but they are not fully persuasive.

In response to Applicants' arguments directed to the description of sequences encoding plant GAD enzymes, set forth at pages 12-18 of the reply and paragraphs 4-7 of the declaration, the written description rejection has been modified to exclude those claims directed to plant GAD enzymes, including plant GAD enzymes that do not include a functional autoinhibitory calmodulin-binding domain. However, the rejection is maintained for claims directed to amino acid sequences having 60% identity to the elected amino acid sequence of SEQ ID NO:2, nucleotide sequences that hybridize to the elected nucleotide sequence of SEQ ID NO:1 under moderately stringent conditions, and polynucleotides that encode any GAD enzyme, because the sequences are not adequately described.

Applicants submit that given the well-known characteristics of GAD enzymes described in the literature prior to the filing of the present application, the very statement of the name "GAD" conveyed a significant amount of information to a person of ordinary skill in the art regarding structural and functional characteristics of the enzyme at the time the present application was filed. Applicants point in particular to the enclosed Declaration Under 37 C.F.R. 51.132 that provides evidentiary support for this assertion (Declaration, paragraph 4). Applicants also submit that the additional recitation of amino acid identity levels and polynucleotide hybridization requirements simply add further structural definition to claims that already include sufficient structural definition due to the knowledge in the relevant art. (reply pages 13-14; Declaration, paragraph 4).

With respect to the enclosed Declaration at paragraph 4 providing evidentiary support for the information GAD conveyed to a person of ordinary skill in the art regarding structural and functional characteristics of the GAD enzyme at the time the present application was filed, the Declaration at paragraph 4 merely asserts that the name GAD conveyed a significant amount of information to one of ordinary skill in the art, without explaining how or why. The singular reference to the Turano et al., previously cited by the Examiner, points out only that the *Arabidopsis* GAD 1 and GAD 2 peptides are divided into 3 distinct regions: (1) a small amino terminal variable region of unknown functional significance, (2) a large highly conserved middle region encoding GAD enyzmatic acitvity, and (3) a small carboxy terminal variable region encoding the calmodulin binding domain, and that the *Arabidopsis* GAD1 and GAD2 sequences comprise a Ser-X-X-Lys amino acid motif common among PLP-requiring enzymes, said Ser-X-X-Lys motif being conserved in both identity and position as compared to GAD enzymes of petunia, tomato, and the *gadA* and *gadB* genes of *E. coli* (Plant Physiology, 1998, Vol. 117, pages 1411-1421, see page 1419 column 1 second full paragraph; see paragraph spanning columns 1 and 2 page 1415; see page 1419 column 1 second full paragraph). These limited observations with respect to two different *Arabidopsis* GAD enzymes do not explain how the name GAD conveyed a significant amount of information to one of ordinary skill in the art, or what that information was.

With respect to the additional recitation of amino acid identity levels and polynucleotide hybridization requirements, the Examiner maintains that the specification does not explicitly describe GAD amino acid sequences having 60% identity to the elected amino acid sequence of SEQ ID NO:2, or nucleotide sequences that hybridize to the elected nucleotide sequence of SEQ

ID NO:1 under moderately stringent conditions and that encode a GAD enzyme. Furthermore, neither the specification nor Applicants' response nor the declaration identify such sequences as having been implicitly described in the prior art.

Applicants also submit that they have described in the specification a representative number of species supporting the claimed genus, and that in contrast to the specification under review in University of California cited by the Examiner, the present specification discloses and describes in detail a variety of sequences that constitute a representative number of sequences of the claimed genus. Applicants further submit that, upon proper consideration of the actual breadth of the claimed subject matter, which is not overly broad as suggested in the Action, the description of nine (9) specific sequences obtained from four different species of dicotyledonous plants (*Arabidopsis*, tobacco, petunia and tomato) within the claimed genus far exceeds a representative number of species, and is much more than a minimum number necessary to support the claimed genus. Applicants also refer to the information set forth in paragraph 6 of the attached Declaration, which sets forth the structural relatedness of the nine sequences in terms of percent sequence identity. (reply pages 14-15; Declaration, paragraphs 5-6).

With respect to the description of a representative number of species supporting the claimed genus and the actual breadth of the claimed subject matter, the Examiner maintains that the description of nine (9) specific sequences obtained from four different species of dicotyledonous plants (*Arabidopsis*, tobacco, petunia and tomato) is not a representative number of species that would describe any GAD enzyme obtained from any organism belonging to any taxonomic category of living species, as would be encompassed by claims 19-20 and 22-23.

Furthermore, the information set forth in paragraph 6 of the attached Declaration sets forth only the structural relatedness of the nine plant sequences, in terms of their percent amino acid sequence identity to each other, said percent amino acid sequence identity being between 72.8% and 91.2%.

Applicants finally submit that when the analysis set forth in the University of California case is applied to the present case, the analysis leads to a conclusion that the written description requirement is met, because in view of the level of knowledge and skill in the relevant art, the naming of a "GAD enzyme" in the present claims conveys sufficient information to a person of ordinary skill in the art regarding the structural characteristics of the claimed subject matter to distinguish it from other materials. Applicants argue that this does not constitute a naming a type of material generally known to exist, in the absence of knowledge as to what the material consists of, but rather, given the wealth of information in the literature regarding functional GAD enzymes, the naming of the material in the present application provides much information to a person of ordinary skill in the art regarding what the material consists of. Applicants also argue that in describing a representative number of species of the claimed genus, one of skill in the art would be able to visualize or recognize the identity of the members of the genus (reply pages 17-18).

As discussed above, Applicants have not established that the naming of a "GAD enzyme" in the present claims conveys sufficient information to a person of ordinary skill in the art regarding the structural characteristics of the claimed subject matter to distinguish it from other

materials, and Applicants have not described a representative number of species of the claimed genus.

Claims 1-15, 19-20, 22-23 and 26-28 remain rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method of decreasing the amount of GAD2 in a plant, decreasing the amount of GABA produced in a plant upon mechanical stimulation, and selecting a transformed plant that exhibits decreased heat shock tolerance, by expressing in a plant a DNA construct comprising a constitutive promoter operably linked in an antisense orientation to a polynucleotide encoding the nonelected GAD2 sequence of SEQ ID NO:4, and while being enabling for a method of increasing the amount of a plant GAD enzyme that does not include a functional autoinhibitory calmodulin-binding domain in a plant, increasing the amount of GABA produced in a plant, and selecting a transformed plant that exhibits (i) stunted growth and decreased fertility or (ii) taller growth and normal fertility, by expressing in a plant a DNA construct comprising a constitutive promoter operably linked in a sense orientation to a polynucleotide encoding a plant GAD enzyme that does not include a functional autoinhibitory calmodulin-binding domain, does not reasonably provide enablement for methods that involve expressing plant GAD enzymes under the control of non-constitutive promoters, or methods that involve expressing plant GAD enzymes other than plant GAD enzymes that do not include a functional autoinhibitory calmodulin-binding domain. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims, for the reasons of record set forth in the office action mailed November 20, 2003.

Applicants' arguments filed April 23, 2004, have been fully considered but they are not fully persuasive.

In response to Applicants' arguments directed to the use of a genus of sequences encoding plant GAD enzymes, set forth at pages 18-19 of the reply and paragraphs 4-6 of the declaration, the scope of enablement rejection has been modified to account for the use of any plant GAD enzyme that does not include a functional autoinhibitory calmodulin-binding domain in a plant, as set forth above. However, the scope of enablement rejection has not been modified to account for the use of any "functional plant GAD enzyme" or any "GAD enzyme", because the effect on transgenic plants of expressing any "functional plant GAD enzyme" or any "GAD enzyme" is unpredictable.

Applicants additionally traverse the Examiner's premise that the full scope of the claimed invention is not enabled on the basis of unpredictability. Applicants specifically argue that the level of unpredictability associated with the present invention is merely that typical of performing any plant genetic transformation events, and does not require undue experimentation. Applicants also argue that a person of ordinary skill in the art, upon reading the present specification, would understand that the results of the invention can be achieved by over-expressing GAD in a plant in a manner whereby increased levels of GABA are produced, but whereby GABA is not overproduced at a level whereby the plant is stunted or sterile or otherwise has undesirable morphological characteristics, and Applicants assert that the present specification clearly teaches to a person of ordinary skill in the art that transformation of a plant in accordance with the invention to achieve controlled enhancement of GABA production, i.e.,

GABA production at a higher level than a wild-type plant, but not so great as to produce stunting, sterility and the like, provides desired characteristics in the plant or plant tissues. Applicants further assert that when this information is considered together with the well-known identity and functionality of GAD enzymes, a person of ordinary skill in the art would readily appreciate that the present specification enables a skilled artisan to transform plants with functional GAD enzymes, and that a person of ordinary skill in the art would further appreciate that, due to the inherent variability associated with plant transformation events, it is appropriate to make multiple transformed plants (preferably 25-50 or more) with a given construct, and then to select one or more plants that over-expresses the functional GAD enzyme at a desired level. While the specification includes data relating to plants transformed with one GAD construct, a person of ordinary skill in the art would reasonably expect to be able to practice the full scope of the claimed invention, including use of constructs including other functional GAD enzymes, in view of the descriptions included in the specification. (reply pages 20-21; Declaration, paragraph 11).

The rejection is maintained because the outstanding rejection was not solely predicated on the unpredictability of using sequences encoding GAD enzymes other than the elected sequence encoding the GAD1 enzyme. In this regard the Examiner maintains that a person of ordinary skill in the art, upon reading the present specification, would understand that the results of the invention can be achieved by over-expressing in a plant a plant GAD enzyme that does not include an autoinhibitory calmodulin-binding domain, rather than any GAD enzyme, in a manner whereby increased levels of GABA are produced, but whereby GABA is not overproduced at a level whereby the plant is stunted or sterile or otherwise has undesirable morphological

characteristics, since both the specification and the prior art indicate that over-expressing in a plant a plant GAD enzyme that includes an autoinhibitory calmodulin-binding domain in has a different effect on GABA levels as a consequence of the presence of the calmodulin-binding domain, and since both the specification and the prior art indicate that different levels of GABA affect plant phenotype differently. The specification does not provide sufficient guidance for one skilled in the art to determine, without undue experimentation, which other "functional plant GAD enzymes" or "GAD enzymes" to express, or how to express them, in order to obtain plants having the desired GABA level and phenotype.

The rejection is also maintained because the inherent variability associated with plant transformation events does contributes significantly to the unpredictability of the claimed invention, as Applicants have indicated that controlled enhancement of GABA production, i.e., GABA production at a higher level than a wild-type plant, but not so great as to produce stunting, sterility and the like, must be achieved in order to provide the desired characteristics in the plant or plant tissues. As set forth at page 11 of the office action mailed November 20, 2003, the level of GAD expression and GAD activity (and consequently GABA production) would be affected by multiple variables which include but are not limited to whether the GAD enzyme retained its calmodulin binding domain, the type of promoter and terminator used in the expression vector, the plant species transformed by the expression vector, the type of tissue in which GAD is expressed, the stability of the mRNA transcribed from the GAD coding sequence, the translation efficiency of the mRNA, GAD stability, the availability of glutamate substrate and other substances, such as calcium and calmodulin and PLP, that would affect GAD activity. Accordingly, practicing the claimed invention could require more than making multiple

transformed plants with a given construct followed by the selection of one or more plants that over-expresses the functional GAD enzyme at a desired level. For example, the level of GAD expression and GAD activity would be affected by the type of promoter used to express the GAD enzyme. Promoters vary in the quality and quantity of expression they provide, such that some promoters may over-expresses the functional GAD enzyme at a desired level and others may not. If a promoter cannot over-expresses the functional GAD enzyme at a desired level, one or more plants that over-expresses the functional GAD enzyme at a desired level cannot be selected.

The specification does not provide sufficient guidance for one skilled in the art to determine which variables to control, or how to control them, in order to obtain a level of GAD expression sufficient to allow for the selection of one or more plants that over-expresses, from a non-constitutive promoter, a functional plant GAD enzyme or a GAD enzyme, at a desired level. Absent such guidance one skilled in the art would have to resort to trial and error experimentation, manipulating one or more variables for each transformation event in order to determine which conditions allow for the selection of one or more plants that over-expresses, from a non-constitutive promoter, a functional plant GAD enzyme or a GAD enzyme, at a desired level, and which conditions do not. Such trial and error experimentation would constitute undue experimentation.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 31-32 and 34-40 remain rejected under 35 U.S.C. 102(b) as being anticipated by Baum et al. (EMBO J., 17 June 1996, Vol. 15, No. 12, pages 2988-2996, Applicant's IDS), for the reasons of record set forth in the office action mailed November 20, 2003.

Applicants' arguments filed April 23, 2004, have been fully considered but they are not persuasive.

Applicants argue that amended claims 31-32 and 34-40 clearly recite subject matter that is not anticipated by the Baum et al. Applicants specifically argue that by amending the claims to recite that the GAD enzyme does not include a functional autoinhibitory calmodulin-binding domain, the claims are directed to subject matter that is novel over Baum et al., because the only transformed plant described by Baum et al. that expressed a GAD enzyme that does not include a functional autoinhibitory calmodulin-binding domain was a plant that exhibited significant loss of growth characteristics, yield, reproductive function or other morphological or agronomic characteristic compared to a non-transformed plant, which is expressly excluded by Applicants' amended claims (reply pages 24-25; declaration paragraph 14).

The rejection is maintained first because Applicants' amended claims do not expressly exclude a plant that exhibits significant loss of growth characteristics, yield, reproductive function or other morphological or agronomic characteristic compared to a non-transformed plant, as claim 31 requires the selection of a transformed plant that alternatively (i) exhibits a GABA concentration in non-stress conditions of up to 0.28 milligrams GABA per gram dry weight of the plant **or** (ii) does not exhibit significant loss of growth characteristics, yield, reproductive function or other morphological or agronomic characteristic compared to a non-

transformed plant, and claim 38 requires that the transformed plant alternatively (i) exhibits a GABA concentration in non-stress conditions of up to 0.28 milligrams GABA per gram dry weight of the plant **or** (ii) does not exhibit significant loss of growth characteristics, yield, reproductive function or other morphological or agronomic characteristic compared to a non-transformed plant.

The rejection is also maintained because while the transformed plants described by Baum et al. that expressed a GAD enzyme that does not include a functional autoinhibitory calmodulin-binding domain were much shorter and more branched as compared to a non-transformed plant, had young developing leaves that exhibited a delay in greening and were narrower as compared to a non-transformed plant, had flowers that lacked pollen and abscised prematurely as compared to a non-transformed plant, had short stem cortex cells and exhibited continued growth as compared to a non-transformed plant, contained high steady state GABA levels and low Glu levels as compared to a non-transformed plant, and lacked normal GAD complexes and had GAD activity that was insensitive to EGTA and trifluoperazine unlike a non-transformed plant, the transformed plants described by Baum et al. that expressed a GAD enzyme that does not include a functional autoinhibitory calmodulin-binding domain nonetheless did not exhibit significant loss of other morphological or agronomic characteristic as compared to a non-transformed plant.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-15, 19-20, 22-23 and 26-27 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Baum et al. (EMBO J., 17 June 1996, Vol. 15, No. 12, pages 2988-2996, Applicant's IDS) in view of McKenzie et al. (Plant Physiology, March 1998, Vol. 116, No.3, pages 969-977), for the reasons of record set forth in the office action mailed November 20, 2003.

Applicants' arguments filed April 23, 2004, have been fully considered but they are not persuasive.

Applicants argue that the Examiner has not identified any motivation in the cited references or any other prior art to combine the references and has simply characterized what the reference teach and concluded that one skilled in the art would be motivated to combine them with no explanation or analysis as to where such a motivation arises. Applicants also argue that that there is no direct suggestion in either reference to combine their teachings and no indirect suggestion that could be considered to be a motivation to combine the teachings of the references. (reply page 26; Declaration, paragraph 17).

The Examiner disagrees that a motivation for combining the references has not been identified. As set forth at page 19 of the office action mailed November 20, 2003, one skilled in the art would have been motivated to combine the teachings of the cited references for the purpose of controlling the phenotypic effect associated with the growth affecting properties of GAD enzyme activity by controlling the time and/or location of GAD enzyme expression. Such motivation arises from the knowledge that one skilled in the art has with respect to the different

effects that are observed when expressing a transgene under the control non-constitutive versus a constitutive promoter.

Applicants additionally argue that the Baum et al. reference teaches away from the present invention, and would discourage a person of ordinary skill in the art from performing work that would lead to the present invention. (reply page 27; Declaration, paragraph 17). In this regard Applicant points out that Baum et al.'s plants that were transformed with a normal GAD (with calmodulin-binding domain) under the control of a constitutive promoter have morphology indistinguishable from that of wild-type plants and do not have increased GABA levels in vivo, and that Baum et al.'s plants that were transformed with a mutant GAD lacking a calmodulin-binding domain under the control of a constitutive promoter are stunted, sterile, and feature other undesirable morphologic characteristics and exhibit above-normal GABA levels in vivo. Applicants assert that the message from this reference to a person of ordinary skill in the art at the time the present application was filed is that elevation of the GABA level in a plant is undesirable, and that transformation of a plant with a de-regulated GAD is therefore undesirable. (reply page 27; Declaration, paragraph 18).

Applicants also assert that this reference suggests that transformation of a plant with a normal GAD (i.e., a GAD including a functional calmodulin-binding domain) has no effect on the GABA levels in the plant or the morphology of the plant, and therefor provides no benefit to the plant. (reply page 27; Declaration, paragraph 18). Applicants further argue that a person of ordinary skill in the art would find no motivation in Baum et al. to transform a plant with a normal GAD or a de-regulated GAD under the control of a non-constitutive promoter, because

he or she would expect the resulting plant to be either unchanged morphologically (if including the calmodulin-binding domain), or alternatively to respond to a signal by producing harmful, and perhaps lethal levels of GABA in the tissues expressing the de-regulated GAD (if not including a functional calmodulin-binding domain), based on the characteristics of the plants disclosed in Baum et al . (reply pages 27-28; Declaration, paragraph 18).

The Examiner maintains that Baum et al. do not teach away from the claimed invention. In this regard the Examiner first points out that none of the rejected claims require that a plant be transformed with a polynucleotide encoding a "normal" GAD enzyme (i.e., a GAD enzyme including a functional calmodulin-binding domain). Claims 1, 26 and 27 require only that the polynucleotide encode a "functional" plant GAD enzyme, and claims 19 and 22 require only that the polynucleotide encode a "GAD enzyme". Furthermore, the rejection under 35 USC 103 was not based on the phenotypic characteristics of the plants transformed with a polynucleotide encoding a "normal" GAD enzyme.

The Examiner also points out that the phenotypic characteristics exhibited by Baum et al.'s plants transformed with a mutant GAD lacking a calmodulin-binding domain under the control of a constitutive promoter are not considered to be undesirable, as dwarf stature and increased branching are desired agronomic traits that are often selected for by plant breeders. While a person of ordinary skill in the art at the time the present application was filed could reasonably conclude from Baum et al. that overall elevation of the GABA level in a plant is probably undesirable, and that transformation of a plant with a de-regulated GAD expressed under the control of a strong constitutive promoter is also probably undesirable, a person of ordinary skill in the art at the time the present application was filed could reasonably appreciate

that desirable phenotypic effects could be obtained by expressing in a plant a de-regulated GAD under the control of an appropriate non-constitutive promoter in order to selectively elevate plant GABA levels.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Remarks

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Collins whose telephone number is (571) 272-0794. The examiner can normally be reached on Monday-Friday 8:45 AM -5:15 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amy Nelson can be reached on (571) 272-0804. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Cynthia Collins

AMY J. NELSON, PH.D
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600